

CLAIMS

1. A multi-beam satellite comprising:

an input section to receive a plurality of uplink spot beams in a first range of frequencies;

an output section to transmit a plurality of downlink spot beams in a second range of frequencies; and

an IF section coupled between said input section and said output section, said IF section to down-convert said plurality of uplink spot beams in said first range of frequencies to a plurality of intermediate signals in an intermediate range of frequencies, flexibly and selectively switch and filter said plurality of intermediate signals in said intermediate range of frequencies, and up-convert said plurality of intermediate signals in said intermediate range of frequencies to said plurality of downlink spot beams in said second range of frequencies.

2. The satellite of claim 1, wherein said first range of frequencies and said second range of frequencies are in a different band of satellite frequencies than the intermediate range of frequencies.

3. The satellite of claim 2, wherein said first range of frequencies and said second range of frequencies are in the K-band and the intermediate range of frequencies are in the C-band.

4. The satellite of claim 1, wherein said IF section up-converts said plurality of intermediate signals in said range of intermediate frequencies with selectable translation amounts.

5. The satellite of claim 1, wherein said payload architecture allocates capacity among said plurality of uplink spot beams by switching and filtering of said plurality of uplink spot beams in said IF section.

6. The satellite of claim 4, wherein said payload architecture allocates combined returned signals from among said one of said plurality of first spot beams selected to contain a gateway by switching said plurality of first spot beams.

7. The satellite of claim 1, wherein said payload architecture comprises a RF module mounted on an antenna, said RF module including a low noise amplifier, or a combination of a low noise amplifier and down-converter (LNA D/C), and redundancy switching.

8. The satellite of claim 7, wherein coaxial cables are used to route signals from said RF modules.

9. The satellite of claim 7, wherein said down-conversions comprise a different translation for different uplink beams.

10. The satellite of claim 9, a first frequency translation is implemented on a first polarization and a second frequency translation, different from the first frequency translation, is implemented on a polarization opposite to the first polarization.

11. The satellite of claim 9, wherein a first frequency translation is performed on said plurality of uplink spot beams and a second frequency translation,

different from the first frequency translation, is performed on a second plurality of uplink spot beams.

12. The satellite of claim 4, wherein said selectable translation amounts are obtained by selection of different local oscillation frequencies.

13. The satellite of claim 4, wherein said IF section performs block down-conversions and the rearrangement and selection of said plurality of uplink spot beam frequencies is performed by selectable up-conversions.

14. A method of switching a plurality of uplink spot beams to a plurality of downlink spot beams in a multi-beam satellite, said method comprising:  
down-converting said plurality of uplink spot beams to a plurality of intermediate frequencies;

selectively switching and filtering said plurality of uplink spot beams at said plurality of intermediate frequencies; and

up-converting said switched and filtered uplink spot beams from said intermediate frequencies by a plurality of selectable frequency translation amounts to the frequencies of said plurality of downlink spot beams.

15. The method of claim 14, wherein said switching and filtering serves to allocate capacity among said plurality of uplink spot beams.

16. The method of claim 14, wherein said plurality of uplink spot beams are down-converted by different translations.

17. The method of claim 16, wherein uplink spot beams are block down-converted by a different translation than other uplink spot beams.

18. The method of claim 16, wherein the uplink spot beams received at a first polarization are block down-converted by a different translation than the uplink spot beams received at a second polarization.

19. The method of claim 14, wherein said selectable frequency translation amounts are obtained by selection of different local oscillation frequencies.

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